

**REMARKS**

Entry of the foregoing amendments, and reconsideration of the subject application, in light of the enclosed Petition for Extension of Time and the following remarks, are respectfully requested.

No new issues have been raised by this amendment.

Claim 1 has been amended; Claims 5, and 7 have been canceled; and consequently, Claims 1-5, 6, and 8-10 are now present in this application.

Attached hereto is a marked version of the amended claims to show changes made by the current amendment. The attached page is captioned "**VERSION WITH MARKINGS TO SHOW CHANGES**"

In brief overview, the fire-protection glass panel of the present invention has a heat-ray reflection film formed on the surface of at least one of the glass plates. The heat-ray reflection film is made of indium oxide containing tin, and has a reflectance of 50% or more, 70% or more, and 80% or more, for a light of a wavelength of 1500nm, 2500nm and 3000nm, respectively. The heat-ray reflection film also has an average transmittance of 60% or more and an average reflectance of 15% or less for visible rays.

Noting that the heat energy of a building fire is mainly light over a range of 2000-3000nm in wavelength, the fire-protection glass panel of the present invention utilizes a low transparency for light wavelengths of 2000-3000nm. However, if a panel having low transparency exhibits high heat absorption, resulting in an elevated temperature that may emit heat to the backside, which is undesirable. Accordingly, the present invention utilizes a film having a high reflectance for a light wavelength of 2000-3000nm.

The heat-ray reflection film used in the panel is made of indium oxide containing tin and has a reflectance of 50% or more, 70% or more, and 80% or more, for a light of a wavelength of 1500nm, 2500nm and 3000nm, respectively. As a result, it can practically prevent heat from the fire from passing through and can ensure the path of refuge at the backside of the panel.

Further, it should be noted that the heat-ray reflection film used in the present invention is transparent to visible light. Therefore, the fire-protection glass panel is able to insure visibility therethrough sufficient to perform recurring activity.

The heat-ray reflection film used in the present invention is very different from a sunlight reflecting coating and a infrared reflecting coating, which are usually used for reflecting the sunlight and infrared radiation, respectively.

It should be noted that sunlight has a peak energy at a wavelength of 550nm. The sunlight reflecting coating is different from the film of the present invention in that it reflects visible light, thereby producing a mirror-like

appearance as opposed to the present invention, which is transparent to visible light.

The infrared reflecting coating is usually used on, for example, window glass, for reflecting infrared radiation emitted from, for example, a heater to provide thermal insulation to the window glass. Infrared rays have wavelengths in excess of 3  $\mu\text{m}$  and a peak energy at a wavelength about 10 $\mu\text{m}$ . Accordingly, it is evident that infrared-reflecting coating is very different from the heat-ray reflection film used in the present invention.

Claims 1-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Friedman in view of Terneu, which rejection is respectfully traversed.

Friedman et al (U.S.P. 5,908,704) teaches that "a surface treatment may be carried out for heat-ray reflection." However, Friedman fails to disclose the particular surface treatment, let alone the meets and bounds, specified in the claims as now amended. Friedman discloses an interlayer film for protective glazing laminates, which is a THV film. It is of particular relevance and should be noted that THV film is very different from the heat-ray reflecting film disclosed and claimed in the present invention, which is made of indium oxide containing tin. Friedman does not disclose or teach the THV film having a reflectance of 50% or more, 70% or more, and 80% or more, for a light of a wavelength of 1500nm, 2500nm and 3000nm, respectively, and further has an

average transmittance of 60% or more and an average reflectance of 15% or less for visible rays. The Examiner pointed to column 6, lines 24-28, of the Friedman reference for support. However, there Friedman only describes the possibility of known heat reflectance treatment being added onto a surface of the laminating substrates. It fails described with particularity what is the known heat reflectance treatment in such a way as to adequately support an obviousness type rejection of the specific limitations of the presently claimed invention. It could be understood by those skilled in the art that the heat reflectance treatment is the sunlight reflecting coating or the infrared-ray reflecting coating. As discussed above, heat radiation protection from the sun is very different from heat radiation from a fire, which involves greater structural consideration than mere use.

Terneu et al reference discloses a transparent glazing panels having an infrared-ray reflecting film, which is very different from the presently claimed heat-ray reflecting film, as already described above. In detail, the infrared-ray reflecting coating is usually used on, for example, a window glass, for reflecting infrared ray emitted from a heater to provide thermal insulation to the window glass. The infrared rays have wave lengths in excess of  $3 \mu\text{m}$  and a peak energy at a wavelength about  $10\mu\text{m}$  (see column 1, lines 7-14). This is distinctively different from the heat-ray reflecting film recited in amended Claim 1. Further, Terneu discloses tin oxide film in the infrared-ray reflecting film. The film is very different from the heat-ray reflecting film in the present invention, which is made of indium oxide containing tin and which has a reflectance of 50% or more,

70% or more, and 80% or more, for a light of a wavelength of 1500nm, 2500nm and 3000nm, respectively, and an average transmittance of 60% or more and an average reflectance of 15% or less for visible rays. The tin oxide film is disclosed in Terneu, but it is lower in the reflectance for the light wavelengths of 2000-3000nm than the indium oxide containing tin. This is evident from comparison of examples 1 and 2 of the present application. Therefore, the present invention of amended claim 1 is neither disclosed nor taught from Friedman and Terneu et al, alone or in combination thereof.

**In conclusion, while discussed above, it is important to emphasized the important aspects of the present invention, *et al*, that substantially differentiate it from the prior art. The claims specifically require a reflectance of 50% or more, 70% or more, and 80% or more, for a light of a wavelength of 1500nm, 2500nm and 3000nm, respectively. While the prior art may allegedly disclose in general the same chemical components as that which is claimed, the prior art fails to disclose the actual material exhibiting the above mentioned characteristics. To assert that such characteristics are simply a matter of design choice would constitute impermissible use of hindsight.**

**Additionally, as discussed above, It should be noted that sunlight has a peak energy at a wavelength of 550nm. The sunlight reflecting coating is different from the film of the present invention in that it reflects visible light,**

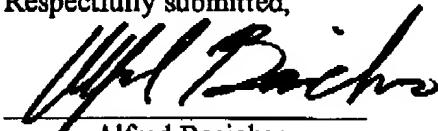
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thereby producing a mirror-like appearance as opposed to the present invention, which is transparent to visible light. Accordingly, this teaching is contrary to the claimed limitation of "an average reflectance of 15% or less for visible rays."

In light of the foregoing, the application is now believed to be in proper form for allowance of all claims and notice to that effect is earnestly solicited. Reconsideration and allowance of the claims is respectfully solicited.

Respectfully submitted,



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Encl.: Marked reproduction of the  
amended original claim 1;  
and Petition for Extension of  
Time.

## VERSION WITH MARKINGS TO SHOW CHANGES

1. (Amended) A fire-protection glass product having a heat shielding characteristic, comprising:
  - a plurality of fireproof glass plats;
  - a resin intermediate layer interposed between adjacent ones of said glass plates; and
  - a heat-ray reflection film formed on the surface of at least one of said glass plates, said heat-ray reflection film being made of indium oxide containing tin and having a reflectance of 50% or more, 70% or more, and 80% or more, for a light of a wavelength of 1500nm, 2500nm and 3000nm, respectively, and an average transmittance of 60% or more and an average reflectance of 15% or less for visible rays.